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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,882	02/09/2004	Kevin Kwong-Tai Chung	AI-TECH-16B	8813

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DANN, DORFMAN, HERRELL & SKILLMAN
1601 MARKET STREET
SUITE 2400
PHILADELPHIA, PA 19103-2307

EXAMINER	
DINH, TUAN T	

ART UNIT	PAPER NUMBER
2841	

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/774,882	CHUNG, KEVIN KWONG-TAI	
	Examiner	Art Unit	
	Tuan T. Dinh	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *17-20* is/are withdrawn from consideration.

5)☒ Claim(s) *9-16,22 and 23* is/are allowed.

6)☒ Claim(s) *1-3,7-8 and 21* is/are rejected.

7)☐ Claim(s) *4-6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *02/09/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *The attached paper*.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Specie I, Sub-Specie V (claims 1-16, and 21-23) in the reply filed on 01/20/05 is acknowledged. The traversal is on the ground(s) that (a) figures 1 and 2 (specie I and II) are not really different species as they relate to the claim, and (b) the search of the product claims would be likely similar to the search of the method claims. This is not found persuasive because: (b) the method claims 17-20 are classified and search in a different class than the product claims, and for a conductive via (as recited in claim 9) does not require the step of plating as claimed in the method claim 17. The via can be made by CVD or PVD instead of using plating; (a), after careful review, the examiner agrees to withdrawn the election restriction mailed on 02/30/04 because the figures 1 and 2 (specie I and II) are not really different species as they relate to the claim.

The requirement is still deemed proper and is therefore made FINAL. Claims 17-20 are withdrawn from further consideration as being drawn to non-elected subject matter.

Abstract

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet ***within the range of 50 to 150 words***. ***It is important that the abstract not exceed 150 words*** in length since the space provided for the

abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

3. Claims 1-3, and 16 objected to because of the following informalities:

Claim 1, line 8, "receiving the contacts" should be changed to - - receiving a plurality of contacts - - for proper antecedence basis.

Claim 2, line 3, "an electronic device" should be changed to - - the electronic device - - for proper antecedence basis.

Claim 3, line 2, "an electronic device having a plurality of contacts" should be changed to - - the electronic device having the plurality of contacts - - for proper antecedence basis.

Claim 3, line 3, "corresponding contact cites" should be changed to - - corresponding the contact cites - -.

Claim 16, lines 1-2, "in combination of an electronic device" should be changed to - - the electronic device - -.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3, 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (U.S. Patent 6,265,782) in view of Bernier et al. (U.S. Patent 5,847,929).

As to claims 1-2, Yamamoto et al. discloses a molecularly flexible dielectric electronic substrate (4, column 20, line 49) as shown in figures 1-3, 5, and 7A-7F comprising:

at least one layer of molecularly flexible dielectric adhesive (1-figures 1 and 5, column 20, lines 29-31 or 3-figures 2-3, and 7, column 20, line 50) having a modulus of elasticity less than about 500,000 psi (the modulus is measured at –50°C to 300°C, see column 14, lines 27-45), having a glass transition temperature less than about 0°C (the heat resistant thermoplastic film having Tg of –10oC or above, see column 4, line 66 through column 5, line 42), and having the ability to withstand soldering at a temperature of about 220°C (see column 5, line 56 through column 6, line 15);

a metal foil (9-figure 5, column 21, line 4) on one surface (a bottom surface of the adhesive 1-figure 5) of said layer of molecularly flexible dielectric adhesive (1-figure 5), wherein said metal foil (9) is patterned to define a pattern of electrical conductors having

a plurality of contact sites (solder balls formed into through holes and connected to the wiring 9).

Yamamoto et al. does not disclose the contact cites of the metal foil for receiving contacts of an electronic device.

Bernier et al. teaches a module assembly (250) as shown in figure 5 comprising a flexible substrate (256) having a plurality of contact cites (pads formed at a bottom of the substrate) connected to contacts (282) of an electronic device (280), see column 8, lines 50-62, column 9, lines 20-25.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have contact cites of a metal foil for receiving contacts of an electronic device as taught by Bernier et al., employed in the substrate of Yamamoto et al. in order to provide a level interconnection structure to form an enclosure electronic/semiconductor packaging.

As to claim 3, Yamamoto et al. does not disclose the electronic device having a plurality of contacts soldered to corresponding contacts sites of the patterned metal foil on said molecularly flexible dielectric adhesive layer.

Bernier et al. teach the electronic device (280) as shown in figure 5 having a plurality of pads (282) soldered (259, 284) to corresponding the contact cites (the pads 260) of the substrate (256).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a device having a plurality of contacts soldered to the contact cites of a metal foil of the substrate as taught by Bernier et al., employed in the

substrate of Yamamoto et al. in order to provide a better conductivity and bonding structure.

As to claims 7-8, Yamamoto et al. discloses said molecularly flexible dielectric adhesive has a modulus of elasticity less than about 100,000 psi or less than about 20, 000 psi (see column 14, lines 27-36, and also, the attached paper attaching with the conversion between Mpa to psi).

6. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (U.S. Patent 6,265,782) in view of Bernier et al. (U.S. Patent 5,847,929) as applied to claims 1-3, and 7-8 above, and further in view of Brodsky et al. (U.S. Patent 5,984,691).

As to claim 21, Yamamoto et al. and Bernier et al. do not disclose a plated electrically conductive layer on at least the contact sites of said metal foil.

Brodsky et al. shows a flexible substrate (50) as shown in figure 1 comprising a plated through hole (63, column 6, lines 50-51) on at least a contact cite of a metal foil (56).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a plated electrically conductive layer on at least the contact sites of said metal foil as taught by Brodsky et al. employed the substrate of Yamamoto et al. and Bernier et al. in order to provide an interconnection between interlayer of a substrate.

Allowable Subject Matter

7. Claims 4-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The references cited do not disclose or render obvious in combination of the substrate further comprising: a protective enclosure sounding the electronic device having attached at least along its periphery to the molecularly flexible dielectric adhesive layer (as recited in claim 4), and an underfill adhesive bonding the electronic device and said molecularly flexible dielectric adhesive layer (as recited in claim 5).

8. Claims 9-16, and 22-23 are allowed.

The following is an examiner's statement of reasons for allowance: the references cited disclose a molecularly flexible dielectric substrate comprising: a first layer of molecularly flexible dielectric adhesive, first and second metal foils defined pattern of first and second electrical conductors, and some other claimed elements. However, they do not disclose or render obvious in combination of the substrate having a plurality of electrically conductive vias through the first layer of molecularly flexible dielectric adhesive, the plurality of electrically conductive vias being in a pattern for providing electrical connection between ones of the first electrical conductors and ones of said second electrical conductors (as recited in claim 9).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wang et al. and Shinada et al. disclose related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T. Dinh whose telephone number is 571-272-1929. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tuan Dinh
May 26, 2005.

50 megapascal (Mpa)
converts to
7251.887194864155470 pounds per square inch (psi) (lb/in²)

THE ATTACHED PAPER..
10|774,882.

100 megapascal (Mpa)
converts to
14503.774389728311000 pounds per square inch (psi) (lb/in^2)

1000 megapascal (Mpa)
converts to
145037.743897283104000 pounds per square inch (psi) (lb/in^2)